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(54) Title: METHOD AND SYSTEM FOR TRANSLATING DOCUMENTS USING TRANSLATION HANDLES

(57) Abstract

   A translation assistance program of a word processing program used to translate a source language document written in a source language to a target language document written in a target language. The translation assistance program displays the source language document on a translation screen portion of a display device. The translation assistance program compares each source term in a product glossary with the source terms in the source language document. The product glossary associates each source term it stores with a target term which translates the source term into the target language. For each source term from the source language document which is stored in the product glossary, the translation assistance program: 1) underlines the source term in the source language document, 2) inserts a translation handle on the translation screen portion immediately after the source term, and 3) associates the translation handle with the target term which translates the source term into the target language. When the user decides to insert the target term at a current insertion point on the translation screen, the user invokes an insert target term command which contains the translation handle associated with the appropriate source term. In response, the translation assistance program retrieves the target term associated with the translation handle and inserts the target term at the current insertion point on the translation portion.

1

Description

METHOD AND SYSTEM FOR TRANSLATING DOCUMENTS USING TRANSLATION HANDLES

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Technical Field

This invention relates generally to a computer method and system for automated translation of documents, and more specifically, to a computer method and system for automated translation of documents using translation handles.

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Background of the Invention

Due to the globalization of trade and the advent of common markets, the process of converting information from one language to another with a computer, called machine-assisted translation (MAT), is becoming increasingly important.

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In MAT systems a human translator prepares a target language document, in a target language, from a source language document, in a source language, using a word processing program, automatic terminology managers, on-line multilingual term banks, and other computer-based tools which boost translator productivity.

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An example using Figure 1 will help illustrate how existing MAT systems operate. Figure 1 is a block diagram of a system 100 which assists a human translator in translating a source language document 112 to a target language document 116. The system 100 consists of a computer 102, a keyboard 104, a mouse 106, and a display screen 108.

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A user of the system 100 invokes a word processing program 110 using either the keyboard 104 or the mouse 106, and creates the source language document 112 containing the text "This is an example". The user then invokes a translation assistant 114 to assist the translator in translating the source language document 112

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2

from the source language (e.g., English) to the target
language document 116 containing the corresponding
sentence in the target language (e.g., German).

To assist the user in translating the source
5   language document 112 to the target language document 116
the translation assistant 114 displays a translation
screen 118 and a dictionary screen 120 on the display
screen 108. The translation screen 118 displays the text
of the source language document 112. The dictionary
10   screen 120 displays source terms 124 and corresponding
translation options 126 which translate a given source
term 124 into the target language. The translation
assistant 114 retrieves each translation option 126 from a
translation dictionary 122 which stores source terms 124
15   and their corresponding translation options 126. Each
translation option 126 on the dictionary screen 120 is
preceded by an identifier such as "a)", "b)", "c)" etc.

With the translation screen 118 and the
dictionary screen 120 displayed on the display screen 108,
20   the user reads the source language document 112 displayed
on the translation screen 118. Next, the user looks away
from the translation screen 118 and at the dictionary
screen 120. By looking at the dictionary screen 120, the
user finds the source terms 124 from the source language
25   document 112 which are displayed on the dictionary screen
120 due to a match with the <source terms 124, translation
option 126> pairs stored in the translation dictionary 122
of the translation assistant 114. The user then chooses
which displayed source term 124 to translate. Then the
30   user determines which corresponding translation option 126
to select to translate the chosen source term 124.
Finally, the user invokes a copy translation command which
copies the selected translation option 126 from the
dictionary screen 120 to the translation screen 118. The
35   user then looks away from the dictionary screen 120 to the
translation screen 118 to see the selected translation
option 126 displayed on the translation screen 118.

3

It is desirable to avoid looking from the translation screen 118 to the dictionary screen 120 in order to insert translation options 126.

It is also desirable to avoid looking from the translation screen 118 to the dictionary screen 120 to determine which source terms 124 from the source language document 112 have been matched with <source term 124, translation option 126> pairs from the translation dictionary 122 of the translation assistant 114.

Summary of the Invention

It is an object of the present invention to provide a function and system to ensure that consistent terminology is used throughout the target language document.

It is another object of the present invention to provide a function and system which offers typing aids to increase the translator's efficiency when translating a source language document into a target language document.

It is another object of the present invention to provide a function and system which allows translations of source terms to be inserted when and where they are needed in a sentence being translated.

It is another object of the present invention to facilitate the process of on-line translation by offering fast access to translated terminology without the need to look at the dictionary screen.

These and other objects, which will be apparent as the invention is more fully described, are provided by a function and system for translating a source language document to a target language document using translation handles. In the preferred embodiment of the present invention, a user invokes a translation assistance program under a word processing program to translate a source language document written in a source language to a target language document written in a target language. The translation assistance program displays the source

4

language document on a translation screen of a display
device. The translation assistance program then compares
each source term in a product glossary with the source
terms in the source language document. The product
5   glossary associates each source term it stores with a
target term which translates the source term into the
target language. For each source term from the source
language document which is found in the product glossary,
the translation assistance program: 1) underlines the
10 source term in the source language document, 2) inserts a
translation handle on the translation screen immediately
after the underlined source term, and 3) associates the
translation handle with the target term which translates
the source term into the target language. When the user
15 decides to insert the target term at a current insertion
point on the translation screen, the user invokes an
insert target term command which contains the translation
handle associated with the appropriate source term. In
response, the translation assistance program retrieves the
20 target term associated with the translation handle and
inserts the target term at the current insertion point on
the translation screen.

        Brief Description of the Drawings
25   Figure 1 is a block diagram showing a prior art
system for translating a source language document to a
target language document.
            Figure 2 is a block diagram of a system
embodying the present invention for translating a source
30 language document to a target language document.
            Figure 3 is a block diagram of typical Microsoft
Lingua categories.
            Figure 4 is a flow diagram of the function
CreateProductGlossary for the system of Figure 2.
35   Figure 5 is a flow diagram of the function
SortProductGlossary for the system of Figure 2.

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Figure 6 is a flow diagram of the function
PrepareDocumentForTranslation for the system of Figure 2.

Figure 7 is a flow diagram of the function
TagEachParagraph for the system of Figure 2.

Figure 8A is a flow diagram of the function
SearchForMatch for the system of Figure 2.

Figure 8B is a flow diagram of the function
MatchStaticString for the system of Figure 2.

Figure 8C is a flow diagram of the function
MatchTemplateString for the system of Figure 2.

Figure 9 is a flow diagram of the function
GenerateTranslationHandle for the system of Figure 2.

Figure 10 is a flow diagram of the function
InsertTranslation for the system of Figure 2.

Figure 11 is a flow diagram of the function
ToggleFirstCharacter for the system of Figure 2.

Figure 12 is a flow diagram of the function
UndoTranslation for the system of Figure 2.

Figure 13 is a flow diagram of the function
CreateTranslationParagraph for the system of Figure 2.

Figure 14A is a block diagram of the source
language document after it has been prepared for
translation by the system of Figure 2.

Figure 14B is a block diagram of the source
language document just before a target term will be
inserted in the source language document using the insert
target term command.

Figure 15A is a block diagram of the source
language document after the user manually types in the
translation for the rest of the heading.

Figure 15B is a block diagram of the source
language document after the user deletes a source language
heading.

Figure 16A is a block diagram of the source
language document after the system of Figure 2 has
automatically inserted a translation for a source language
sentence.

Figure 16B is a block diagram of the source language document after the system of Figure 2 has inserted a target term in the source language document in response to the insert target term command.

Figure 17A is a block diagram of the source language document after the user has mistakenly inserted the wrong target term using the insert target term command.

Figure 17B is a block diagram of the source language document after the user has invoked an undo translation handle request.

Figure 18A is a block diagram of the source language document.

Figure 18B is a block diagram of the source language document after the user has entered the insert target term command for a template string.

Figure 19A is a block diagram of the source language document after the user has issued a toggle capitalization request.

Figure 20A is a block diagram of the source language document after a source language paragraph has been deleted by the paragraph command.

Figure 20B is a block diagram of the target language document created after the source language document has been fully translated using the system of Figure 2.

Figure 21 is a block diagram of a product glossary for the system of Figure 2 used to implement the translations depicted in Figures 14A-20B.

Appendix A is a user's guide for the system of Figure 2.

7

Detailed Description of the Invention

Overview:

The present invention provides a function and
system which overcomes the problems of existing machine-
5   assisted translation (MAT) systems. The preferred system
200 (Figure 2) of the present invention provides a
translation assister 208 which translates a source
language document 202, written in a source language, to a
target language document 206 written in a target language.
10 First, the translation assister 208 displays the source
language document 202 on a display device 234.   The
translation assister 208 then compares each source term
214 in a product glossary 212 with each source term 203 in
the source language document 202. The product glossary
15 212 associates each source term 214 with a target term 218
which translates the source term 214 into the target
language.   For each source term 214 from the source
language document 202 which matches at least one source
term 214 in the product glossary 212, the translation
20 assister 208: 1) underlines the source term 203 in the
source language document 202, 2) inserts a translation
handle (described in more detail below) such as a
superscript character, immediately after the source term
203, and 3) associates the translation handle with the
25 target term 218 in the product glossary 212 which
translates the source term 203 into the target language.

When the user decides to translate the source
term 203 by inserting the target term 218 on the display
device 234, the user of the system 200 invokes an insert
30 target term command which contains the translation handle
associated with the source term 203 to be translated. In
response, the translation assister 208 retrieves the
target term 218 associated with the translation handle
contained in the insert target term command, and inserts
35 the target term 218 on the display device 234.

8

The System:

An example using Figure 2 will illustrate a typical translation process using a MAT system 200 operating according to the present invention. First, a
5   user of the system 200 invokes word processing program 204 using a mouse 205. Then the user enters text on a keyboard 207 to create the source language document 202. Both the word processing program 204 and the source language document 202 are stored in the computer memory
10   209. The source language document 202 comprises a series of source terms 203 from a source language (e.g., English). Once the source language document 202 has been created, the user often desires to translate the source language document 202 into the target language document
15   206 (e.g., German).

To perform this translation, the present invention provides, in addition to the word processing program 204, a translation assister 208 and a spreadsheet program 210. The user invokes the spreadsheet program 210
20   and creates a product glossary 212 which associates a source term 214 with a target term 218 which is a translation of the source term 214 into the target language. The preferred product glossary 212 contains four columns of data: the source term 214, a category
25   216, the target term 218, and a comment 220. In the preferred embodiment, the order of the columns of the product glossary 212 must be the same order shown in the product glossary 212 of Figure 2, and the four columns must be named "Source Term", "Category", "Target Term",
30   and "Comment".

The category 216 classifies each <source term 214, target term 218> pair. The product glossary 212 preferably contains categories 216 which conform to standard Microsoft Lingua abbreviations. Figure 3 sets
35   forth some typical Lingua abbreviations such as "MNU" for menu names, "COM" for command names, and "MAC" for macro names.

9

In the preferred embodiment the source term 214
and the target term 218 comprise a word, a phrase, a
sentence, or a template string. The template string is a
commonly occurring sentence or phrase with embedded
template variables. Template variables are place holders
for terms which change or vary. In the preferred
embodiment template variables are identified by a leading
% sign followed by the appropriate Lingua abbreviation
(such as one of those shown in Figure 3). Thus, the
template variable for a menu name is %MNU.

A brief discussion of the invention as it
applies to the template strings will help illustrate the
usefulness of template strings. Assume a first phrase
"Choose Open from the File menu" as well as a second
phrase "Choose Convert Table to Text from the Table menu"
are commonly occurring phrases in the source language
documents to be processed by the system 200. Through the
use of template strings with embedded template variables,
the system 200 can provide machine assistance in
translating these phrases to the target language.

For example, the user creates the template
string for these commonly occurring phrases by first
determining that the words "Choose _____ from the
_____" are common to both of the phrases. Next, the
user determines that the word "Open" from the first phrase
and the words "Convert Table to Text" from the second
phrase are classified as commands (%COM) in the Lingua
classification system. Then, the user determines that the
word "File" in the first phrase and the word "Table" in
the second phrase are classified as menu names (%MNU) in
the Lingua classification system. After making these
determinations, the user invokes the spreadsheet program
210 and stores the following data in the product glossary
212:

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TABLE 1

SOURCE TERM	CATEGORY	TARGET TERM
Choose %COM from the %MNU	TEM	Wählen Sie den Befehl %COM aus dem Menü %MNU
Convert Table to Text	COM	Tabelle in Text Umwandeln
Table	MNU	Tabelle
Open	COM	Öffnen
File	MNU	Datei

When the system 200 processes the source language document 202 for translation, the system 200 will recognize the phrase "Choose Open from the File menu" as well as the phrase "Choose Convert Table to Text from the Table menu" because both phrases match the template string set forth in Table 1. Upon recognition of either phrase, the system 200 provides easy access to a translation for the phrase, using the target term associated with the template string stored in Table 1. The process used by the system 200 to provide such easy access to the translation for each phrase is described in more detail below.

Returning to the discussion of how to create the preferred product glossary 212 using the spreadsheet program 210, the user invokes the spreadsheet program 210 and stores appropriate data in the product glossary 212. The user of the system 200 then invokes a product glossary sorter 222 of the translation assister 208 to sort the data in the product glossary 212. In the preferred embodiment, the product glossary sorter 222 performs the steps of the method SortProductGlossary (set forth in more detail below in Figure 5). The product glossary sorter 222 retrieves all source terms 214 which are template strings and sorts the template strings according to length, with the longest source term 214 being stored in the product glossary 212 before the shortest source term.

11

For template strings which are of equal length,
the product glossary sorter 222 invokes a product glossary
alphabetizer 224 which alphabetizes the template strings
which are of equal length.   Any well-known alphabetizing
5   program can be used to implement the product glossary
alphabetizer 224.
Next, the product glossary sorter 222 sorts by
length   all   source   terms 214   which   are   not   template
strings.   Then the product glossary alphabetizer 224 case-
10 sensitively alphabetizes the non-template strings which
are of equal length. In this way upper case versions of a
letter are sorted above lowercase versions of the letter.
After the product glossary alphabetizer sorter
224 properly sorts the <source term 214, target term 218,
15 category 216> tuples of the product glossary 212, the user
invokes a source language document preparer 226 of the
translation assister   208   which   prepares   the   source
language document 202 for translation by the user of the
system 200.   In the preferred embodiment, the source
20 language document preparer 226 performs the steps of the
function PrepareDocumentForTranslation set forth in more
detail below and shown in Figure 6.
To prepare the source language document 202 in a
manner to assist the user in translating the source
25 language document 202 into the target language document
206, the source language document preparer 226 invokes a
tag   paragraph   program   228,   a   comparer 230,   and   a
translation handle generator 232.
The   tag   paragraph   program   228   creates   a
30 paragraph tag, which uniquely identifies a paragraph
within   the   source   language   document   202,   for   each
paragraph in the source language document.   In the
preferred embodiment, the tag paragraph program 228
performs the steps of the function TagEachParagraph set
35 forth in more detail below and shown in Figure 7.
The source language document preparer 226 then
invokes the comparer 230.   In the preferred embodiment,

the comparer 230 performs the steps of the function
SearchForMatch set forth in more detail below and shown in
Figures 8A-8C. The comparer 230 compares each source term
214 in the product glossary 212 with the source terms 203
5   in the source language document 202. For each "match"
between one of the given source terms 214 in the product
glossary 212 and one of the source terms 203 in the source
language document 202, the source language document
preparer 226 invokes the translation handle generator 232.
10   The translation handle generator 232 associates
the matched source term 203 with the target term 218 which
translates the source term 203 into the target language.
In the preferred embodiment, the translation handle
generator 232 performs the steps of the function
15   GenerateTranslationHandle set forth in more detail below
and shown in Figure 9.
             The translation handle generator 232 first
underlines the matched source term 203 so as to make the
matched source term 203 easier to locate when displayed on
20   a display device 234 than unaltered source terms. The
translation handle generator 232 then inserts a
translation handle in the form of a superscript character
(not shown) immediately after the underlined source term
203 (e.g., the letter J).
25   For example, if the source language document 202
contains the phrase "Finding Text in a Document" and the
product glossary 212 contains the source term "Document",
then the comparer 230 will find a "match" between the
source term "Document" in the source language document 202
30   and the source term "Document" in the product glossary
212. The translation handle generator 232 will then alter
the appearance of the phrase "Finding Text in a Document"
so that it appears as "Finding Text in a Document^{J}".
Returning to the discussion of the translation handle
35   generator 232, the translation handle generator 232 stores
in an index file 248 a paragraph tag 250, a translation
handle 252, a source term 254, and a target term 256.

13

The paragraph tag 250 identifies the paragraph which contains the underlined source term 203. The translation handle 252 corresponds to the superscript character inserted after the underlined source term 203. The source term 254 corresponds to the underlined source term 203. The target term 256 corresponds to the target term 218 from the product glossary 212 which translates the underlined source term 203 into the target language.

In this way, the translation generator 232 associates the translation handle 252 with the target term 256 which translates the source term 254 into the target language. This association allows a user of the system 200 to retrieve and insert the target term 256 merely by invoking an insert target term command containing the appropriate translation handle 252.

Thus the translation handle generator 232 does not typically insert a target term 256 directly in place of a matched source term 203 because such an insertion only saves time if it happens to occur at the beginning or the end of a source language sentence in the source language document 202, and if the syntax of an equivalent target language sentence is the same as that of the source language sentence 258. By associating the translation handle 252 with the target term 256 in the index file 248 the present invention provides access to translations which the user inserts when and where they are needed in the source language sentence through the use of insert target term commands.

Once the source language document 202 has been prepared by the source language document preparer 226, the user translates the source language document 202 into the target language document 206 using a translation inserter 236, a translation paragraph creater 238, a character changer 240, and a translation remover 242, all of which will be discussed in more detail below in connection with the translation assister 208.

14

First, the user invokes the word processing
program 204 to display source terms 235 in the prepared
source language document 202 on the display device 234.
The source terms 235 on the display device 234 correspond
5   to the source terms 203 of the source language document
202 stored in the computer memory 209. When the user
determines that the target term 256 associated with the
translation handle 252 should be inserted at a current
insertion point displayed on the display device 234, then
10   the user invokes the insert target term command using the
keyboard 207 or the mouse 205.   The insert target term
command automatically invokes the translation inserter
236. In the preferred embodiment, the insert target term
command consists of the simultaneous depression using the
15   keyboard 207 of a CTRL key (not shown), a SHIFT key (not
shown) and a keyboard 207 letter key (not shown)
associated with the translation handle 252.   The process
by which the system 200 carries out the insert target term
command is set forth in more detail below and is shown in
20   Figure 10.

In response to the insert target term command,
the translation inserter 236 retrieves the target term 256
from the index file 248 which is associated with the
superscript character contained in the insert target term
25   command and the paragraph which currently contains the
insertion point, and inserts the target term 256 at the
current insertion point on the display device 234. In the
preferred embodiment, the translation inserter 236
performs the steps of the function InsertTranslation set
30   forth in more detail below and shown in Figure 10.

The present invention also allows the user to
insert target terms 256 in a separate translation
paragraph (not shown) or in the source language sentence
237, on the display screen 234, to be translated.   To
35   insert target terms 256 in the source language sentence
237, the user merely invokes the insert mode of the word
processing program 204.   Typically this involves

depressing an insert key on the keyboard 255. As target
terms 256 are inserted in the source language sentence
237, the source terms 235 in the source language sentence
237 change position on the display device 234 to provide
5 space in which to insert the target terms 256.

To insert target terms 256 in a translation
paragraph, the user enters a create translation paragraph
command, which invokes the translation paragraph creater
238 of the translation assister 208. In the preferred
10 embodiment, the translation paragraph creater 238 performs
the steps of the function TranslationParagraph set forth
in more detail below and shown in Figure 13. The
advantage to the user of inserting target terms 256 in the
separate translation paragraph is that the source terms
15 235 on the display device 234 remain stationary during
translation because they are in a separate paragraph.

The present invention also provides the
character changer 240 which toggles the first character of
the last target term 256 inserted with the insert target
20 term command on the display device 234. In other words,
if the first letter of the last inserted target term 256
is a lower case letter, then the character changer 240
replaces the lowercase letter with an uppercase version of
the letter. Likewise, if the first letter of the target
25 term 256 is an uppercase character, then the character
changer 240 replaces the uppercase letter with a lowercase
version of the uppercase letter. In the preferred
embodiment, the character changer 240 performs the steps
of the function ToggleFirstCharacter set forth in more
30 detail below and shown in Figure 11.

The translation remover 242 of the translation
assister 208 deletes the last target term 256 inserted on
the display device 234 along with any text entered on the
display device 234 between the last target term 256 and
35 the current position of the insertion point. In the
preferred embodiment, the translation remover 242 performs

the steps of the function UndoTranslation set forth in
more detail below and shown in Figure 12.

Flow Diagrams

            Figure 4 is a flow diagram of the function
5   CreateProductGlossary which sets forth the manual steps
    performed by the user to create the product glossary 212
    of Figure 2.   In the preferred embodiment, the function
    CreateProductGlossary is performed using the spreadsheet
    program 210 (Figure 2).   In step 401 of Figure 4, the
10 function CreateProductGlossary creates a spreadsheet file
    with column headings, from left to right, of <source term,
    category, target term, comment>.   In step 402, the
    function enters in the spreadsheet columns, the character
    strings typically found in the source language documents
15 to be translated.   In step 403, the function
    CreateProductGlossary ends processing.

            Figure 5 is a flow diagram of the function
    SortProductGlossary which sorts the product glossary 212
    according to the length of the source terms 214.   In the
20 preferred embodiment, the function SortProductGlossary is
    performed by the product glossary sorter 222 and the
    product glossary alphabetizer 224 (Figure 2).   For all
    source terms 214 of equal length, the function case-
    sensitively alphabetizes the source terms 214.

25   In step 501 of Figure 5 the function creates
    four new column headings in the product glossary 212.   The
    new column headings are <source term, category, target
    term, comment>.   In step 502, the function retrieves all
    source terms 214 from the previously existing columns of
30 data in the product glossary 212 which are template
    strings.   In step 503, the function sorts all retrieved
    template strings by length, with the longest template
    strings sorted to the top of the file and above the
    shortest template strings.   The function stores the sorted
35 template strings in the new spreadsheet columns.   In step
    504, the function alphabetizes, in the new columns of the

product glossary 212, all template strings of equal
length.

In step 505, the function sorts by length, all
source terms 214 which are not template strings. In step
5   506, for all non-template source terms 214 of equal
length, the function case-sensitively alphabetizes the
non-template source terms 214, such that uppercase letters
are sorted above lowercase letters in the product glossary
212. In step 507, the function deletes the "old"
10 spreadsheet columns where the original data was stored.
In step 508, the function SortProductGlossary removes all
duplicate entries from the product glossary 212. In step
509, the function SortProductGlossary returns processing
control to the word processing program 204 (Figure 2).
15   Figure 6 is a flow diagram of the function
PrepareDocumentForTranslation which underlines and assigns
a translation handle to each source term 203 of the source
language document 202 which has a corresponding source
term 214 in the product glossary 212. In the preferred
20 embodiment, the function PrepareDocumentForTranslation is
performed by the source language document preparer 226
(Figure 2).

In step 601 of Figure 6, the function retrieves
the product glossary 212. In step 602, the function
25 PrepareDocumentForTranslation calls the function
TagEachParagraph, which creates a paragraph tag for each
paragraph in the source language document 202, that
uniquely identifies that paragraph. The function
TagEachParagraph is set forth in more detail below and
30 shown in Figure 7.

In step 603, the function determines whether
unprocessed source terms 203 from the source language
document 202 still remain. If unprocessed source terms
203 do still remain then the function performs steps 604
35 through 606. In step 604, the function
PrepareDocumentForTranslation calls the program
SearchForMatch which compares the source term 203 from the

source language document 202 with each source term 214 in
the product glossary 212, while looking for a match
between the source terms. The function SearchForMatch is
set forth in more detail below and shown in Figures 8A,
5 8B, and 8C.

In step 605 the function
PrepareDocumentForTranslation determines if a match was
found by the function SearchForMatch, between the source
term 203 and one of the source terms 214 of the product
10 glossary 212. If no match was found then the function
PrepareDocumentForTranslation continues processing with
step 603.

If a match was found between the source term 203
and one of the source terms 214 of the product glossary
15 212, then the function PrepareDocumentForTranslation calls
the function GenerateTranslationHandle, in step 606. The
function GenerateTranslationHandle underlines the matched
source term 205, assigns a translation handle to the
matched source term 203, and associates the translation
20 handle with the target term from the target language which
translates the source term 203 into the target language.
The function GenerateTranslationHandle is set forth in
more detail below and shown in Figure 9. Upon completion
of step 606, the function PrepareDocumentForTranslation
25 continues processing by returning to step 603.

Returning to the discussion of step 603, if all
source terms 203 from the source language document 202
have been processed, then in step 607 the function
PrepareDocumentForTranslation returns processing control
30 to the word processing program 204 (Figure 2).

Figure 7 is a flow diagram of the function
TagEachParagraph which associates a paragraph tag,
uniquely identifying each paragraph in the source language
document 202, with a given paragraph. In the preferred
35 embodiment, the function TagEachParagraph is performed by
the paragraph marker 228 (Figure 2).

In step 701 of Figure 7 the function TagEachParagraph determines whether every paragraph in the source language document 202 has been assigned a paragraph tag. If paragraphs remain in the source language

5   document 202 which have not been assigned a paragraph tag, then the function TagEachParagraph continues processing with steps 702-704. In step 702 the function TagEachParagraph retrieves the first paragraph in the source language document 202 that has not been assigned a

10 paragraph tag. In step 703 the function creates a paragraph tag by concatenating the name of the source language document 202 with a current paragraph number. The function assigns paragraph numbers sequentially from a first paragraph in the source language document 202 to a

15 last paragraph in the source language document. In step 704 the function TagEachParagraph associates the paragraph tag with the retrieved paragraph. In a preferred embodiment the paragraph tag is implemented as a paragraph mark in Microsoft Word Version 2.0. Paragraph

20 tags are described in more detail in the "Word for Windows 2.0 User's Guide", Chapter 40, and "Using Work Basic", both of which are incorporated herein by reference. Upon completion of step 704, the function continues processing with step 701.

25   Returning to the discussion of step 701, if the function TagEachParagraph determines that every paragraph in the source language document 202 has been assigned a paragraph tag, then the function TagEachParagraph returns processing control to the function

30 PrepareDocumentForTranslation.

Figure 8A is a block diagram of the function SearchForMatch which determines whether a match exists between the source terms 214 from the product glossary 212 and any of the source terms 203 from the source language

35 document 202. In the preferred embodiment the function SearchForMatch is performed by the comparer 230 (Figure 2).

20

In step 801 of Figure 8A the function determines
if there are source terms 214 from the product
glossary 212 that have not yet been processed. If at
least one unprocessed source term 214 remains in the
5   product glossary 212 then in step 802 the function
retrieves the first unprocessed source term 214 from the
product glossary 212. In step 803 the function determines
whether the retrieved source term 214 is a template
string. If the retrieved source term 214 is a template
10   string then in step 804 the function SearchForMatch calls
the function MatchTemplateString. Upon completion of
step 804 the function SearchForMatch returns processing
control to the function PrepareDocumentForTranslation
(Figure 6). The function MatchTemplateString is set forth
15   in more detail below and is shown in Figure 8C.
Returning to the discussion of step 803, if the
retrieved source term 214 is not a template string then
the function SearchForMatch, in step 806, calls the
function MatchStaticString set forth in more detail below
20   and shown in Figure 8B. Upon completion of step 806 the
function SearchForMatch returns processing control to the
function PrepareDocumentForTranslation (Figure 6).
Figure 8B is a flow diagram of the function
MatchStaticString which compares non-template source
25   terms 214 retrieved from the product glossary 212 with the
source terms 203 and the source language document 202. In
the preferred embodiment the comparer 230 (Figure 2)
performs the steps of the function MatchStaticString.
In step 807 of Figure 8B the function
30   MatchStaticString compares the retrieved source term 214
from the product glossary 212 with the source terms 203 in
the source language document 202. In step 808 the
function determines whether there is a match between the
retrieved source term 214 from the product glossary 212
35   and at least one of the source terms 203 from the source
language document 202. If there was a match then
processing continues with steps 809-814. In step 809 the

21

function determines if there is a one-to-one
correspondence between the retrieved source term 214 from
the product glossary 212 and the matched source terms 203
in the source language document 202. If a one-to-one
5   correspondence exists then in step 810 the function
assigns the value true to the boolean variable match. In
step 811 the function MatchStaticString returns processing
control to the function SearchForMatch (Figure 8A).

        Returning to the discussion of step 809, if the
10 function determines that there is not a one-to-one
correspondence then in step 812 the function determines if
there are less than five letters appended to the end of
the source terms 203 from the source language document 202
which do not match the source term 214 retrieved from the
15 product glossary 212. If the "extra" letters are less
than five, then in step 813, the function assigns the
value true to the boolean variable match. Upon completion
of step 813, the function MatchStaticString, in step 811,
returns processing control to the function SearchForMatch
20 (Figure 8A).

        Returning to the discussion of step 812, if the
function determines that there are five or more letters
appended to the end of the source term(s) 203 from the
source language document 202, then in step 814, the
25 function assigns the value false to the boolean variable
match.   Upon completion of step 814 the function
MatchStaticString returns processing control, in step 811,
to the function SearchForMatch (Figure 8A).

        Returning to the discussion of step 808, if
30 there was not a match between the retrieved source
term 214 from the product glossary 212 and any of the
source terms 203 in the source language document 202 then
the function, in step 815, assigns the value false to the
boolean variable match. Upon completion of step 815 the
35 function MatchStaticString, in step 811, returns
processing control to the function SearchForMatch
(Figure 8A).

22

Figure 8C is a flow diagram of the function
MatchTemplateString which compares the template string
retrieved from the product glossary 212 with the source
terms 203 from the source language document 202. In the
5   preferred embodiment the comparer 230 (Figure 2) performs
the steps of the function MatchTemplateString.

In step 816 of Figure 8C the function assigns
the value true to the boolean variable match. In step 817
the function assigns a position indicator to the beginning
10 of the source language document 202. In step 818 the
function determines if there is a portion of the template
string that remains unprocessed. If the entire template
string has been processed then in step 819 the function
MatchTemplateString returns processing control to the
15 function SearchForMatch (Figure 8A).

If an unprocessed portion of the template string
remains, then in step 820 the function MatchTemplateString
determines if the variable match is currently set to true.
If the variable match is currently set to false then in
20 step 821 the function MatchTemplateString returns
processing control to the function SearchForMatch
(Figure 8A).

Returning to the discussion of step 820, if the
variable match is set to true then in step 822 the
25 function MatchTemplateString determines if the unprocessed
portion of the template string is a template variable. If
the function determines that the unprocessed portion of
the template string was a template variable then
processing continues with steps 823 through 830.

30   In step 823 the function determines the category
of the template variable. In step 824 the function
determines whether unprocessed source terms 214 of the
determined category type remain in the product
glossary 212. If all source terms 214 of the determined
35 category type have been processed then the function
continues processing with step 818.

23

If unprocessed source terms 214 of the
determined category type remain in the product
glossary 212 then in step 825 the function retrieves the
first unprocessed source term 214 of the determined
5   category type from the product glossary 212. In step 826
the function compares the retrieved source term 214 from
the product glossary 212 with the source term(s) 203 in
the source language document 202 located after the
position indicator. In step 827 the function determines
10 whether there was a match. If there was not a match then
in step 828 the function assigns the value false to the
boolean variable match. Upon completion of step 828
processing continues with step 824.

            Returning to the discussion of step 827, if the
15 function determines that there was a match then in
step 829 the function assigns the value true to the
boolean variable match. In step 830 the function moves
the position indicator to the end of the matched source
term 203 in the source language document 202. Upon
20 completion of step 830 processing continues with step 818.

            Returning to the discussion of step 822, if the
function determines that the unprocessed portion of the
template string is not a template variable, then
processing continues with steps 831-835. In step 831 the
25 function retrieves character strings from the template
string until a template variable is reached or until the
end of the template string is reached. In step 832 the
function compares the retrieved character strings with the
source terms 203 from the source language document 202
30 located after the position indicator. During the process
of comparing, the function, in step 832, moves the
position indicator each time a new source term is
compared.

            In step 833 the function determines whether
35 there was a match during the comparison performed in
step 832. If there was a match then in step 834 the
function assigns the value true to the boolean variable

24

match.   Upon completion of step 834 processing continues
with step 818.

Returning to the discussion of step 833, if the
function determines that there was not a match during the
5 comparison performed in step 832, then in step 835 the
function assigns the value false to the boolean variable
match.   Upon completion of step 835 processing continues
with step 818.

Figure 9 is a flow diagram of the function
10 GenerateTranslationHandle which associates a translation
handle with the matched source term 203 from the source
language document 202 and then associates the target
term 218 from the product glossary 212, which translates
the match source term 203 into the target language, with
15 the translation handle.   In the preferred embodiment the
translation handle generator 232 (Figure 2) performs the
function GenerateTranslationHandle.

In step 901 of Figure 9 the function determines
if source terms 203 from the source language document 202,
20 which matched the source terms 214 from the product
glossary 212, still remain unprocessed.   If unprocessed
source terms 203 still remain then the function processes
steps 902-905.

In   step 902   the   function
25 GenerateTranslationHandle retrieves the first unprocessed
source term 203 from the source language document 202.   In
step 903 the function underlines the retrieved source term
203 and inserts a translation handle in the form of a
superscript character at the end of the retrieved source
30 term 203.   In the preferred embodiment, the superscript
characters are cycled on a per paragraph basis.   For
example, assume the superscript characters J, K, L, . . .
are used as the translation handles for source terms 203.
If three source terms 203 are to be assigned translation
35 handles in a first paragraph, then the three source terms
are assigned the superscript characters J, K, and L,
respectively.   If two source terms 203 in a second

25

paragraph are to be assigned translation handles, then the
superscript characters J and K are "cycled" and assigned
to the two source terms 203 in the second paragraph.

In step 904 the function retrieves the paragraph
tag for the paragraph in the source language document 202
which contains the retrieved source term 203. In step 905
the function stores the retrieved paragraph tag, the
superscript character, the retrieved source term 203, and
the target term 218, which translates the retrieved source
term 203 into the target language, in an index file 248
associated with the source language document 202. Upon
completion of step 905 processing continues with step 901.

Returning to the discussion of step 901, if the
function determines that all source terms 203 from the
source language document 202 have been processed, then in
step 906 the function GenerationTranslationHandle returns
processing control to the source language document
preparer 226.

Figure 10 is a flow diagram of the function
InsertTranslation which inserts the target term 256 from
the index file 248 associated with the source term 235
displayed on the display device 234. In the preferred
embodiment, the translation inserter 236 (Figure 2)
performs the function InsertTranslation.

In step 1001 of Figure 10 the function receives
an insert translation request. In a preferred embodiment
the insert translation request is performed by pressing a
key combination on the keyboard 207 (Figure 2) containing
the translation handle in the form of the superscript
character. In step 1002 the function retrieves the
translation handle in the form of the superscript
character from the received insert translation request.
In step 1003 the function retrieves the paragraph tag from
the paragraph in the source language document 202 which
contains the current insertion point displayed on the
display device 234. In step 1004 the function retrieves
and opens the index file 248 associated with the source

26

language document 202.   In   step 1005   the   function
retrieves from the index file 248 the target term 256
associated with the retrieved superscript character and
the retrieved paragraph tag.   In step 1006 the function
5   InsertTranslation   inserts   both   a   bookmark   and   the
retrieved target term 256 at the current insertion point
on the display device 234.   The bookmark marks a location
in the source document 202.   In step 1007 the function
InsertTranslation returns processing control to the word
10   processing program 204.
            Figure 11 is a flow diagram of the function
ToggleFirstCharacter.   In the preferred embodiment the
character changer 240 (Figure 2) implements the function
ToggleFirstCharacter.
15   In step 1101 of Figure 11 the function receives
a toggle capitalization request.   In step 1102 the
function determines the location of the last bookmark
inserted with an insert translation request in the source
language document 202 on the display device 234.   In
20   step 1103 the function retrieves the first character of a
character string after the bookmark.   In step 1104 the
function determines if the retrieved character is a
letter.   If the retrieved character is a letter then in
step 1105 the function determines if the retrieved first
25   character is capitalized.   If the retrieved first
character   is   capitalized   then   the   function
ToggleFirstCharacter replaces the first character with a
lowercase version of the same character in step 1106.   In
step 1107   the   function   ToggleFirstCharacter   returns
30   processing control to the word processing program 204.
            Returning to the discussion of step 1105, if the
retrieved first character is not capitalized then in
step 1108 the function replaces the first character with a
capitalized version of the same character.   In step 1107
35   the   function   ToggleFirstCharacter   returns   processing
control to the word processing program 204.

Returning to the discussion of step 1104, if the
function determines that the retrieved character is not a
letter then in step 1107 the function ToggleFirstCharacter
returns processing control to the word processing program
5   204.

Figure 12 is a flow diagram of the function
UndoTranslation which deletes the last target term 256
inserted in the source language document 202 on the
display device 234.   In the preferred embodiment, the
10 translation   remover   242   performs   the   function
UndoTranslation.

In step 1201 of Figure 12 the function receives
an undo translation handle request.   In step 1202 the
function locates the last bookmark inserted in the source
15 language document 202 with an insert translation request.
In step 1203 the function deletes all source terms 235
from the display device 234 stored between the located
bookmark and the current insertion point on the display
device 234.   In step 1204 the function UndoTranslation
20 returns to the word processing program 204.

Figure 13 is a flow diagram of the function
TranslationParagraph   which   either   creates   a   new
translation paragraph on the display device 234 in which
to translate a source language sentence 237 or which
25 deletes a paragraph which contains source terms 235 that
have been translated.   In the preferred embodiment the
translation paragraph creator 238 (Figure 2) performs the
steps of the function TranslationParagraph.

In step 1301 of Figure 13 the function receives
30 a paragraph command.   In step 1302 the function locates
the source language paragraph in the source language
document 202 displayed on the display device 234 which
contains the current insertion point.   In step 1303 the
function determines if the located paragraph is preceded
35 by a colon. If the function determines that the paragraph
is not preceded by the colon then in step 1304 the
function inserts a colon immediately before the source

language   paragraph 237   displayed   on   the   display
device 234.   In step 1305 the function inserts a temporary
paragraph mark to mark the end of the translation
paragraph.   In step 1306 the function positions the
insertion point just before the temporary paragraph mark.
In step 1307 the function TranslationParagraph returns
processing   control   to   the   translation   assister 208
(Figure 2).

          Returning to the discussion of step 1303, if the
function determines that the located paragraph is preceded
by a colon, then in step 1308 the function deletes the
colon, the source language paragraph immediately following
the colon, and the temporary paragraph mark.   Upon
completion of step 1308, the function TranslationParagraph
returns processing control to the translation assister 208
(Figure 2).

Specific Example:
          A specific example using Figures 14-21 will help
illustrate the preferred function of translating the
source language document 202 (Figure 2) to the target
language   document   206.   Figures   14-20   are   diagrams
depicting a state of the display device 234 (Figure 2) at
various stages of the translation process. Figure 21 is a
block diagram of the product glossary 212 used to
implement the translations depicted in Figures 14-20.

          Figure 14A is a block diagram of the source
language document 202 after the source language document
preparer 226 has prepared it for translation by the user
of the system 200.   The source language document 202
includes the translation handle 1402 and the insertion
point 1404.

          Figure 14B depicts a state of the display device
234 after the German translation, "Text in einem," is
inserted at the location of the current insertion point
1404.   The user manually types in the translation because
the phrase "Finding Text in a" does not have a translation

29

handle associated with it. When the user of a system 200
is ready to translate the English language word "document"
to the German language, the user enters the insert
translation request, CTRL+SHIFT+J, which inserts the
German translation (*i.e.*, the target term 256 from the
index file 248) for the English word Document (*i.e.*, the
source term 203) at the location of the current insertion
point 1404.   Figure 15A depicts a state of the display
device 234 after the user entered the insertion request
for   "document",   received   .the   translation   (*i.e.*
"Document"), and manually typed in the translation for
"find" (*i.e.* "finden").

          Now that the heading 1504, "Finding Text in a
document", has been completely translated, the user
deletes the heading 1504.   Figure 15B depicts a state of
the display device 234 after the user deletes the heading
1504.

          In Figure 16A the sentence 1602 has been
automatically inserted in the source language document 202
by the source language document preparer 226.   In the
preferred embodiment of the present invention, when a
template string which comprises a complete sentence is
found in the source language document 202, the source
language document preparer 226 of the translation assister
208 inserts the target term 256 from the index file 248
associated with the template string into the source
language document 202.   As Figure 21 depicts, the German
phrase "Wahlen Sie aus dem Menu %MNU den Befehl %COM" is
the target term 256 for the template string "From the %MNU
menu choose %COM".

          The next line in the source language document
202 contains the template string "Find What box" (see
Figure 21) associated with the translation handle 1606.
The user proceeds to translate the sentence "In the Find
What box, type the .text you want to find".   More
specifically, the user proceeds to translate that sentence
in a translation paragraph.   Therefore, the user enters

the create translation paragraph command which inserts a
temporary paragraph marker to mark the end of the
translation paragraph and a colon 1608 immediately in
front of the English language text to be translated. The
5 user first manually types in the translation for "In the"
(i.e. "In dem"). The user then enters using the keyboard
207 the insert translation request for the translation
handle "J" and, as Figure 16B depicts, the German
translation "Zu findender Text" (i.e., the associated
10 target term 256) is inserted in the translation paragraph
by the translation inserter 236. It should be noted that
the translation handle "J" has been "cycled" in the sense
that the translation handle "J" was used earlier to insert
the target term 256 associated with the source term
15 "Document" found in an earlier paragraph.

          Figure 17A depicts what a state of the display
device 234 would have looked like had the user of the
system 200 mistakenly entered the insert translation
20 request for the translation handle "K" instead of the
insert translation request for the translation handle "J".
The display screen 234 would have appeared in the state of
Figure 17A with the phrase "Wahlen Sie dann die
Schaltflache Weitersuchen" inserted in the source language
25 document 202, instead of in the state of Figure 16B, with
the phrase "Zu findender Text" inserted in the source
language document 202. Oftentimes, the user of the system
200 will continue typing on the keyboard 207 before
recognizing that an inappropriate target term 256 has been
30 inserted into the source language document 202. Figure
17A depicts such a case, with the phrase "geben Sie"
entered after the mistaken insertion of the target term
256. In such a case, the user of the system 200 merely
invokes the undo translation handle request, which in the
35 preferred embodiment comprises CTRL+SHIFT+X. Figure 16B
depicts a state of the display device 234 after the undo
translation handle request has been entered.

Turning to Figures 18A and 18B, the user
proceeds to translate the sentence "Then choose the Find
Next button", using the translation handle 1804. As
Figure 21 depicts, the phrase "Then choose the Find Next
5 button" is a template string.

Figure 18B depicts a state of the display screen
234 after the user has entered the insert translation
request for the translation handle "K". However, the
first character of the target term 256 associated with the
10 phrase "Then choose the Find Next button" contains
inappropriate capitalization given its position within the
translated sentence, namely a capital "W" for the term
"Wahlen". The user then enters the toggle first character
command which comprises the entry of CTRL+SHIFT+0 on the
15 keyboard 244. Note that the user enters the toggle first
character command to change the first character 1806 while
the current insertion point 1808 is not located at the
first character 1806. Figure 19A depicts a state of the
display device 234 after the user enters the toggle first
20 character command and the character changer 240 has
inserted the character 1902, in the form of a lowercase
"w", in place of the character 1806 (Figure 18B) which
contained the capital "W".

Figure 19A also depicts the English paragraph
25   In the Find What box, type the text
         you want to find. Then choose the
         Find Next button to begin the search.
which has been completely translated. By entering the
paragraph command a second time, the user of the system
30 200 deletes the English paragraph. Figure 20A depicts a
state of the display screen 234 after the translation
paragraph creator 238 has deleted the translated English
paragraph.

Figure 20B depicts a state of the display screen
35 234 after the remaining portion of the document 202 has
been translated using the techniques set forth in more

detail above, thus creating the target language document
206.

      It will be appreciated that, although a specific
embodiment of the invention has been described herein for
purposes of illustration, various modifications may be
made without departing from the spirit and scope of the
invention. Accordingly, the invention is not limited
except as by the appended claims.

<center>Claims</center>

1.   A computer system for translating a source
language document written in a source language to a target
language document written in a target language, the source
language including a multiplicity of source terms and the
target language including a multiplicity of target terms, the
computer system including a display screen, the source
language document, a product glossary having a plurality of
source terms from the source language and a plurality of
target terms from the target language, each source term being
associated with the corresponding target term which translates
the source term into the target language, the computer system
comprising:

        means for producing a translation screen portion on
the display screen, the translation screen portion including a
current insertion point;

        means for displaying the source language document on
the translation screen portion;

        means for comparing each of the plurality of source
terms from the product glossary with the source terms in the
source language document;

        inserting means for inserting a character adjacent
to the source term in the source language document, in
response to each comparison by the comparing means which
produces a match between one of the source terms in the source
language document and one of the source terms in the product
glossary;

        means for associating in an index file the inserted
character with a target term from the product glossary that
translates the matched source term from the source language
into the target language;

        means for inputting an insert target term command
which contains a translation request character corresponding
to the inserted character;

        means for retrieving the translation request
character from the insert target term command;

34

means for retrieving from the index file the target
term associated with the retrieved translation request
character; and

means for inserting the retrieved target term on the
translation screen portion in response to the insert target
term command.

2. The computer system of claim 1 further
comprising means for underlining the matched source term in
response to each comparison by the comparing means which
produces a match between one of the source terms in the source
language document and one of the source terms in the product
glossary.

3. The computer system of claim 1 further
comprising means for replacing a lowercase version of a first
character in a most recent target term inserted by the
insertion means, with an uppercase version of the character
without having to move the current insertion point into
alignment with the first character.

4. The computer system of claim 1 further
comprising means for deleting a most recent target term
inserted by the insertion means, without having to move the
current insertion point into alignment with the most recently
inserted target term.

5. The computer system of claim 1 wherein the
insertion means includes means for inserting the retrieved
target term at the current insertion point on the translation
screen portion.

6. The computer system of claim 1 wherein the
target terms include template strings which are one of a
partial and a full sentence containing variables.

35

7.   A method executed in a computer system for
translating a source language document written in a source
language to a target language document written in a target
language, the source language including a multiplicity of
source terms and the target language including a multiplicity
of target terms, the computer system including a display
screen, the source language document, a product glossary
having a plurality of source terms and a plurality of target
terms, with each source term being associated with the
corresponding target term which translates the source term
into the target language, the method comprising the steps of:

producing a translation screen on the display
screen, the display screen including a current insertion point
indicating where data will be inserted on the translation
screen;

displaying the source language document on the
translation screen;

comparing each of a plurality of source terms from
the product glossary with the source terms in the source
language document;

inserting a character immediately after the source
term in the source language document displayed on the
translation screen in response to each comparison in the step
of comparing which produces a match between one of the source
terms in the source language document and one of the source
terms in the product glossary;

associating in an index file the inserted character
with the corresponding target term from the product glossary
that translates the matched source term from the source
language into the target language;

inputting an insert command which contains a
translation request character corresponding to the inserted
character;

retrieving the translation request character from
the insert command;

retrieving from the index file the target term
associated with the retrieved translation request character;
and
inserting the retrieved target term on the
translation screen.

8. The method of claim 1 further comprising the
step of underlining the matched source term in response to
each comparison in the step of comparing which produces a
match between one of the source terms in the source language
document and one of the source terms in the product glossary.

9. The method of claim 1 further comprising the
step of replacing a lowercase version of a first character in
a most recent target term inserted in the step of inserting,
with an uppercase version of the first character, without
having to move the current insertion point into alignment with
the first character.

10. The method of claim 1 further comprising the
step of deleting a most recent target term inserted by the
inserting means, without having to move the current insertion
point into alignment with the target term..

11. The method of claim 1 wherein the step of
inserting includes the step of inserting the retrieved target
term at the current insertion point on the translation screen.

12. The method of claim 1 wherein the target terms
include template strings which are one of a partial and a full
sentence containing variables.

Figure 1

Figure 2

CATEGORY	DESCRIPTION	EXAMPLE
MNU	Menu name	File
COM	Command name	Print
TDB	Title of dialog box	Print
BUT	Name on a button	OK (also: Cancel, Page Setup, Help)
TXB	Text box name	From (also: To, Copies)
OPT	Option button name (round buttons in dialog boxes)	All (also: Pages, Sheet, Notes, Both)
CHX	Check box name	Preview (also: Fast, but no Graphics)
TXT	Text string in a dialog box	Printer (also: Print Range, Print)
DIA	All other dialog box items	Print Quality (this is a "combo box")
MSG	Message (i.e., status, error)	For Help on dialog settings, press F1 (appears in status bar when the Print dialog box is displayed)
MAC	Macro name	Built-in macro in Excel, Project, Word, etc.
KEY	Key name	ENTER, F1, CAPS LOCK
FLD	Field name	E.g., Date or Author fields in WinWord

Figure 3

Create
Product Glossary

Create a Spread-
sheet File with
Column Headings
From Left to Right
of <Source Term,
Category, Target
Term, Comment>

401

Enter in the
Spreadsheet
Columns, Character
Strings Typically
Found in the
Source Language
Documents to be
Translated

402

End

403

Figure 4

Sort Product
Glossary

Create New
<Source
Term, Category,
Target Term,
Comment>
Columns
in the Product
Glossary   501

Retrieve All
Template Strings   502

Sort by Length and
Store in the Newly   503
Created Product
Glossary Columns

For All Template
Strings of Equal
Length, Alphabetize   504
and Store in the
Newly Created
Product Glossary
Columns

Sort All
Non-Template
Source Terms by   505
Length and Store
in Newly Created
Product Glossary
Columns

For All Remaining
Strings of Equal
Length,
Alphabetize, with
Uppercase Letters   506
Sorted Above
Lowercase Letters,
and Store in the
Newly Created
Product Glossary
Columns

Delete "Old"
Columns with   507
Existing Data

Remove Duplicate   508
Entries From
the Glossary

Return   509

Figure 5

```
        ( Prepare Document )
        (   for Translation  )
                 │
                 ▼
        ┌─────────────────┐
        │  Retrieve the   │      601
        │     Product     │
        │    Glossary     │
        └─────────────────┘
                 │
                 ▼
        ┌─────────────────┐
        │    Tag Each      │     602
        │   Paragraph      │
        └─────────────────┘
                 │
                 ▼
            ╱─────────╲        603
           ╱    Do     ╲
          ╱ Unprocessed ╲
    NO   ╱ Source Terms  ╲  YES
  ◄─────▕ the Source Lang▏─────►
         ╲uage Document ╱
          ╲  Remain    ╱
           ╲    ?     ╱
            ╲────────╱
                                ┌─────────────────┐
   ( Return )      607          │   Search for    │   604
                                │     Match       │
                                └─────────────────┘
                                        │
                                        ▼
                                    ╱────────╲      605
                          YES      ╱  Was a   ╲    NO
                        ◄─────────▕   Match    ▏───────►
                                   ╲  Found   ╱
                                    ╲   ?    ╱
                                     ╲──────╱

                 ┌─────────────────┐
                 │    Generate     │    606
                 │   Translation   │
                 │     Handle      │
                 └─────────────────┘
```

Figure 6

```
        ╭─────────────╮
        │  Tag Each   │
        │  Paragraph  │
        ╰─────────────╯
              │
              │  ◄───────────────────────────────┐
              ▼                                    │
            ╱╲  701                                │
          ╱      ╲                                 │
        ╱    Has    ╲                              │
      ╱  Every Para-  ╲                            │
YES ╱ graph in the Source ╲  NO                    │
◄──╱ Language Document  ╲──────┐                   │
    ╲  Been Assigned   ╱        │                   │
      ╲ a Paragraph  ╱          ▼                   │
        ╲  Tag?    ╱       ┌──────────────┐         │
          ╲      ╱         │ Retrieve the First │   │
            ╲  ╱           │ Paragraph that has │ 702│
             ╲╱            │   not been Given   │   │
                           │  a Paragraph Tag   │   │
                           └──────────────┘         │
                                 │                   │
                                 ▼                   │
                           ┌──────────────┐         │
                           │   Create a   │         │
                           │ Paragraph Tag by │     │
                           │ Concatenating the │    │
                           │   Name of the    │ 703 │
                           │ Source Language  │     │
                           │  Document with   │     │
                           │   the Current    │     │
                           │ Paragraph Number │     │
                           └──────────────┘         │
                                 │                   │
                                 ▼                   │
                           ┌──────────────┐         │
                           │ Associate the │        │
                           │ Paragraph Tag │        │
                           │ with the Retrieved │   │
                           │  Paragraph so  │ 704   │
                           │ that the Paragraph │   │
                           │   Tag for the  │       │
                           │    Retrieved   │       │
                           │ Paragraph can  │       │
                           │ Itself be Retrieved │  │
                           └──────────────┘         │
                                 │                   │
                                 └───────────────────┘
```

```
   ╭─────────────╮
   │   Return    │  705
   ╰─────────────╯
```

Figure 7

Figure 8A

```
                    ┌──────────────────┐
                    │   Match Static   │
                    │      String      │
                    └──────────────────┘
                             │
                             ▼
                    ┌──────────────────┐
                    │     Compare      │
                    │ the Retrieved    │
                    │ Source Term From │
                    │   the Product    │        807
                    │ Glossary with the│
                    │  Source Terms in │
                    │    the Source    │
                    │Language Document │
                    │   for a Match    │
                    └──────────────────┘
                             │
                             ▼
┌──────────────┐   815          808
│     Set      │◄─────  NO  ◄── ╱╲  Was  ╱╲
│ Match = False│               ╱  There an  ╲
└──────────────┘               ╲ Exact Match╱
       │                        ╲    ?    ╱
       │                         ╲──┬──╱
       │                            │ YES
       │                            ▼
       │           810          ╱╲      ╱╲      809   Is There One-To-One
       │    ┌──────────────┐   ╱ YES     ╲           Correspondence
       │    │     Set      │◄─ ╲          ╱          Between the Retrieved
       │    │ Match = False│    ╲        ╱           Source Term from the
       │    └──────────────┘     ╲──┬──╱             Product Glossary and
       │           │                │ NO             the Matched Source
       │           │                ▼                Term(s) in the Source
       │           │                                 Language Document?
       │           │   813       ╱╲      ╱╲   812   Are There Less than
       │    ┌──────────────┐   ╱ YES     ╲          Five Letters Appended
       │    │     Set      │◄─ ╲          ╱         to the End of the
       │    │ Match = True │    ╲        ╱          Source Term(s) from
       │    └──────────────┘     ╲──┬──╱            the Source Language
       │           │                │ NO            Document Which
       │           │                ▼               do not Match the
       │           │     ┌──────────────┐           Source Term
       │           │     │     Set      │   814     Retrieved from the
       │           │     │ Match = False│           Product Glossary?
       │           │     └──────────────┘
       │           │                │
       │           │                ▼
       │           └────────►  ┌──────────┐   811
       └──────────────────────►│  Return  │
                               └──────────┘
```

Figure 8B

```
         ┌──────────────────────┐
         │   Match Template     │
         │       String         │
         └──────────┬───────────┘
                    │
         ┌──────────┴───────────┐
         │  Set Match = True    │──── 816
         └──────────┬───────────┘
                    │
         ┌──────────┴───────────┐
         │   Set a Position     │
         │  Indicator to the    │──── 817
         │   Beginning of the   │
         │  Source Language     │
         │     Document         │
         └──────────┬───────────┘
  ┌──┐              │
  │C ├──────────────┤
  └──┘              │
              818   │                   820                          821
         ┌────────────────┐       ┌──────────────┐          ┌──────────────────┐
         │   Is there     │       │    Does      │   NO     │                  │
         │  a Portion of  │  YES  │  Match = True │────────▶│      Return       │
         │ the Template String│──────▶│      ?       │          │                  │
         │ that Remains   │       │              │          └──────────────────┘
         │  Unprocessed   │       └──────┬───────┘
         │       ?        │              │
         └───────┬────────┘              │ YES
                 │ NO                     │
                 │        819            │
         ┌───────┴────────┐              │
         │     Return     │              │
         └────────────────┘              │        822
                                  ┌──────┴───────┐
                          NO      │   Is the     │
                        ┌─────────│ Unprocessed  │
                        │         │Portion a Template│
                        │         │   Variable   │
                     ┌──┴──┐      │      ?       │
                     │  B  │      └──────┬───────┘
                     └─────┘             │ YES
                                  ┌──────┴───────┐
                                  │ Determine the │
                    ┌─────┐       │  Category of the│──── 823
                    │  E  ├──────▶│   Template    │
                    └─────┘       │   Variable    │
                                  └──────┬───────┘
                                         │        824
                                  ┌──────┴───────┐
                                  │     Do       │
                          NO      │ Unprocessed  │
                        ┌─────────│Source Terms of the│
                        │         │Determined Category│
                        │         │  Remain in the │
                        │         │   Product     │
                        │         │   Glossary    │
                        │         │      ?       │
                        │         └──────┬───────┘
                        │                │ YES
                        │             ┌──┴──┐
                        └─────────────│  A  │
                                      └─────┘
```

Figure 8C

A

Retrieve the First
Unprocessed
Source Term of   825
the Determined
Type from the
Product Glossary

Compare the
Retrieved Source
Term from the
Product Glossary
with the Source   826
Terms in the
Source Language
Document
Located After the
Position Indicator

828

Set
Match = False ←NO— Was
There a   827
Match
?

YES

Set
Match = True   829

Move the
Position Indicator
to the End of the
Matched Source   830
Term in the
Source Language
Document

B

Retrieve Character
Strings Until a
Template Variable   831
or the End of the
Template String
is Reached

E

Compare the
Retrieved Character
Strings with the
Source Terms
From the Source
Language
Document Located   832
After the Position
Indicator, while
Moving the
Position Indicator
Each Time a New
Source Term is
Compared

833

Was
There a   YES→ Set
Match   Match = True   834
?

NO

Set
Match = False   835

C

Figure 8C (Continued)

Generate
Translation Handle

901 Do Source Terms
from the Source
Language Document
which Matched
Source Terms in
the Product Glossary
Still Remain that
Have not yet been
Processed?

906

Return ◄── NO

YES

Retrieve the First
Unprocessed Source
Term from the
Source Language
Document — 902

Underline the
Retrieved Source
Term and Insert
a Superscript
Character at the
End of the
Retrieved Source
Term — 903

Retrieve the
Paragraph Tag
for the Paragraph
in the Source
Language Document
Which Contains
the Retrieved
Source Term — 904

Store the Retrieved
Paragraph Tag, the
Superscript
Character, the
Retrieved Source
Term, and the
Target Term Which
Translates the
Retrieved Source
Term Into the
Target Language,
in an Index File
Associated with
the Source
Language Document — 905

Figure 9

```
        ╭─────────────────────╮
        │  Insert Translation │
        ╰─────────────────────╯
                   │
                   ▼
        ┌─────────────────────┐
        │  Receive an Insert  │      1001
        │     Translation     │
        │      Request        │
        └─────────────────────┘
                   │
                   ▼
        ┌─────────────────────┐
        │   Retrieve the      │
        │    Superscript      │      1002
        │ Character from the  │
        │ Insert Translation  │
        │      Request        │
        └─────────────────────┘
                   │
                   ▼
        ┌─────────────────────┐
        │   Retrieve the      │
        │   Paragraph Tag     │
        │  of the Paragraph   │
        │    in the Source    │      1003
        │ Language Document   │
        │   Which Contains    │
        │     the Current     │
        │  Insertion Point    │
        └─────────────────────┘
                   │
                   ▼
        ┌─────────────────────┐
        │ Retrieve and Open   │
        │   the Index File    │      1004
        │   Associated with   │
        │     the Source      │
        │ Language Document   │
        └─────────────────────┘
                   │
                   ▼
        ┌─────────────────────┐
        │ Retrieve from the   │
        │   Index File the    │
        │    Target Term      │
        │   Associated with   │      1005
        │    the Retrieved    │
        │    Superscript      │
        │ Character and the   │
        │ Retrieved Paragraph │
        │        Tag          │
        └─────────────────────┘
                   │
                   ▼
        ┌─────────────────────┐
        │ Insert a Bookmark   │
        │ and the Retrieved   │      1006
        │   Target Term at    │
        │    the Current      │
        │  Insertion Point    │
        └─────────────────────┘
                   │
                   ▼
        ╭─────────────────────╮
        │       Return        │      1007
        ╰─────────────────────╯
```

Figure 10

Toggle First
Character

Receive a Toggle
Capitalization
Request — 1101

Determine the
Location of the
Last Bookmark
Inserted in the
Translation
Paragraph — 1102

Retrieve the First
Character of the
Character String
After the Located
Bookmark — 1103

Is
the First
Character a
Letter? — 1104

Is
the First
Character
Capitalized ? — 1105

No   Yes

Replace the First
Character with a
Capitalized Version
of the First
Character — 1108

Replace the First
Character with a
Lowercase Version
of the First
Character — 1106

Return — 1107

Figure 11

```
        ╭─────────────╮
        │    Undo     │
        │ Translation │
        ╰─────────────╯
               │
               ▼
      ┌─────────────────┐
      │ Receive an Undo │  1201
      │   Translation   │
      │  Handle Request │
      └─────────────────┘
               │
               ▼
      ┌─────────────────┐    1202
      │ Locate the Last │
      │ Bookmark Inserted│
      │    in the Source│
      │Language Document│
      └─────────────────┘
               │
               ▼
      ┌─────────────────┐   1203
      │  Delete the Text│
      │Between the Located│
      │ Bookmark and the│
      │ Current Insertion│
      │      Point      │
      └─────────────────┘
               │
               ▼
        ╭─────────────╮   1204
        │   Return    │
        ╰─────────────╯
```

Figure 12

```
        ╭──────────────╮
        │  Translation │
        │   Paragraph  │
        ╰──────────────╯
                │
                ▼
        ┌──────────────┐   1301
        │   Receive a  │
        │   Paragraph  │
        │   Command    │
        └──────────────┘
                │
                ▼
      ┌──────────────────┐   1302
      │ Locate the Source│
      │ Language Paragraph│
      │   which Contains │
      │    the Current   │
      │  Insertion Point │
      └──────────────────┘
                │
                ▼
              ◇ Is            1303
      No    ◇  the Located  ◇   Yes
    ◄───────◇ Paragraph Preceded◇───────►
            ◇  by a Colon?  ◇
              ◇
```

┌──────────────────┐   ┌──────────────────┐
│ Insert a Colon │   1304   │ Delete the Colon,│ 1308
│   Immediately   │   │   the Source   │
│   Before the   │   │   Language   │
│ Source Language │   │ Paragraph, and │
│   Paragraph   │   │   the Temporary │
└──────────────────┘   │ Paragraph Mark │
        │   └──────────────────┘
        ▼
┌──────────────────┐   1305
│Insert a Temporary│
│ Paragraph Mark │
│ to Mark the End │
│ of the Translation│
│   Paragraph   │
└──────────────────┘
        │
        ▼
┌──────────────────┐   1306
│   Position the   │
│ Insertion Point │
│ Just Before Newly│
│   Inserted   │
│ Paragraph Mark │
└──────────────────┘
        │
        ▼
    ╭──────────────╮   1307
    │   Return   │
    ╰──────────────╯

Figure 13

234

1404 ~

```
┌──────────────────────────────────────────────────────┐
│ ▣                    DEMO.DOC                         │
│ │Finding Text in a Document· ── 1402                   │
│  Wählen Sie aus dem Menü Bearbeiten den Befehl Suchen. In the Find What
│  box·, type the text you want to find. Then choose the Find Next button^K to
│  begin the search.
│
│  Replacing Text in a Document·                          │── 202
│  Wählen Sie aus dem Menü Bearbeiten den Befehl Ersetzen. Type the text
│  you want to find in the Find What box·, and the replacement text in the Replace
│  With box^K. Then choose the Find Next button^L to begin the search.
│
│  ▣▣▣
└──────────────────────────────────────────────────────┘
```

Figure 14A

1404 ~   234

```
┌──────────────────────────────────────────────────────┐
│ ▣                    DEMO.DOC                         │
│ Text in einem│Finding Text in a Document· ── 1402       │
│  Wählen Sie aus dem Menü Bearbeiten den Befehl Suchen. In the Find What
│  box·, type the text you want to find. Then choose the Find Next button^K to
│  begin the search.
│
│  Replacing Text in a Document·                          │── 202
│  Wählen Sie aus dem Menü Bearbeiten den Befehl Ersetzen. Type the text
│  you want to find in the Find What box·, and the replacement text in the Replace
│  With box^K. Then choose the Find Next button^L to begin the search.
│
│  ▣▣▣
└──────────────────────────────────────────────────────┘
```

Figure 14B

Figure 15A

Figure 15B

DEMO.DOC — 234

Text in einem Document finden — 1602 — 1604

Wählen Sie aus dem Menü Bearbeiten den Befehl Suchen. In dem

1608

In the Find What box⁴, type the text you want to find. Then choose the Find
Next button⁶ to begin the search.

— 1606

Replacing Text in a Document⁴

Wählen Sie aus dem Menü Bearbeiten den Befehl Ersetzen. Type the text
you want to find in the Find What box⁴, and the replacement text in the Replace
With box⁶. Then choose the Find Next button⁶ to begin the search.

— 202

Figure 16A

DEMO.DOC — 234

Text in einem Document finden

Wählen Sie aus dem Menü Bearbeiten den Befehl Suchen. In dem Feld "Zu
findender Text"

In the Find What box⁴, type the text you want to find. Then choose the Find
Next button⁶ to begin the search.

— 202

Replacing Text in a Document⁴

Wählen Sie aus dem Menü Bearbeiten den Befehl Ersetzen. Type the text
you want to find in the Find What box⁴, and the replacement text in the Replace
With box⁶. Then choose the Find Next button⁶ to begin the search.

Figure 16B

234

DEMO.DOC

Text in einem Document finden

1702

Wählen Sie aus dem Menü Bearbeiten den Befehl Suchen. In dem
Wählen Sie dann die Schaltfläche "Weitersuchen" geben Sie───1706
In the Find What box[J], type the text you want to find. Then choose the Find
Next button[L] to begin the search.

Replacing Text in a Document[J]

Wählen Sie aus dem Menü Bearbeiten den Befehl Ersetzen. Type the text
you want to find in the Find What box[J], and the replacement text in the Replace
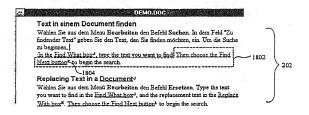With box[K]. Then choose the Find Next button[L] to begin the search.

202

Figure 17A

234

DEMO.DOC

Text in einem Document finden

Wählen Sie aus dem Menü Bearbeiten den Befehl Suchen. In dem|
In the Find What box[J], type the text you want to find. Then choose the Find
Next button[L] to begin the search.

Replacing Text in a Document[J]

Wählen Sie aus dem Menü Bearbeiten den Befehl Ersetzen. Type the text
you want to find in the Find What box[J], and the replacement text in the Replace
With box[K]. Then choose the Find Next button[L] to begin the search.

202

Figure 17B

DEMO.DOC

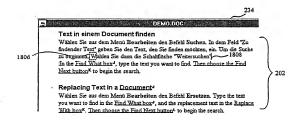**Text in einem Document finden**

Wählen Sie aus dem Menu Bearbeiten den Befehl Suchen. In dem Feld "Zu
findender Text" geben Sie den Text, den Sie finden möchten, ein. Um die Suche
zu beginnen,

In the Find What box , type the text you want to find. Then choose the Find
Next button to begin the search.

— 1802

— 1804

Replacing Text in a Document

Wählen Sie aus dem Menü Bearbeiten den Befehl Ersetzen. Type the text
you want to find in the Find What box , and the replacement text in the Replace
With box . Then choose the Find Next button to begin the search.

202

Figure 18A

234

DEMO.DOC

Text in einem Document finden

Wählen Sie aus dem Menü Bearbeiten den Befehl Suchen. In dem Feld "Zu
findender Text" geben Sie den Text, den Sie finden möchten, ein. Um die Suche
zu beginnen, Wählen Sie dann die Schaltfläche "Weitersuchen" — 1808
In the Find What box , type the text you want to find. Then choose the Find
Next button to begin the search.

1806 —

Replacing Text in a Document

Wählen Sie aus dem Menü Bearbeiten den Befehl Ersetzen. Type the text
you want to find in the Find What box , and the replacement text in the Replace
With box . Then choose the Find Next button to begin the search.

202

Figure 18B

234

DEMO.DOC

Text in einem Document finden

Wählen Sie aus dem Menü Bearbeiten den Befehl Suchen. In dem Feld "Zu findender Text" geben Sie den Text, den Sie finden möchten, ein. Um die Suche zu beginnen, wählen Sie dann die Schaltfläche "Weitersuchen".

In the Find What box, type the text you want to find. Then choose the Find Next button to begin the search.

Replacing Text in a Document

Wählen Sie aus dem Menü Bearbeiten den Befehl Ersetzen. Type the text you want to find in the Find What box, and the replacement text in the Replace

1902

202

Figure 19A

234

DEMO.DOC

Text in einem Document finden
Wählen Sie aus dem Menü Bearbeiten den Befehl Suchen. In dem Feld "Zu
findender Text" geben Sie den Text, den Sie finden möchten, ein. Um die Suche
zu beginnen, wählen Sie dann die Schaltfläche "Weitersuchen".

Replacing Text in a <u>Document</u>
Wählen Sie aus dem Menü Bearbeiten den Befehl Ersetzen. Type the text
you want to find in the <u>Find What box</u>, and the replacement text in the <u>Replace
With box</u>. Then choose the Find Next button to begin the search.

202

Figure 20A

234

DEMO.DOC

Text in einem Document finden
Wählen Sie aus dem Menü Bearbeiten den Befehl Suchen. In dem Feld "Zu
findender Text" geben Sie den Text, den Sie finden möchten, ein. Um die Suche
zu beginnen, wählen Sie dann die Schaltfläche "Weitersuchen".

Text in einem Document ersetzen
Wählen Sie aus dem Menü Bearbeiten den Befehl Ersetzen. Geben Sie den
Text, den Sie finden möchten, in dem Feld "Zu findender Text" und den neuen
Text in dem Feld "Ersetzen mit" ein. Um die Suche zu beginnen, wählen Sie
dann die Schaltfläche "Weitersuchen".

206

Figure 20B

Figure 21

INTERNATIONAL SEARCH REPORT

Inte   .onal Application No

PCT/US 94/02136

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5   G06F15/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 5   G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category°	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP,A,0 514 305 (IBM) 19 November 1992 see page 2, column 2, line 13 - line 38 ---	1-12
A	EP,A,0 357 344 (SHARP) 7 March 1990 see page 2, column 2, line 21 - page 3, column 3, line 56 ---	1-12
A	GB,A,2 199 170 (SHARP) 29 June 1988 see page 4, line 16 - page 6, line 9 ---	1-12
A	GB,A,2 211 641 (SHARP) 5 July 1989 see page 2, line 4 - page 4, line 11 ---	1-12
A	US,A,4 685 060 (YAMANO ET AL.) 4 August 1987 see column 1, line 36 - line 55 ---	1-12
	-/--	

[X] Further documents are listed in the continuation of box C.   [X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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